

This listing of claims will replace all prior versions, listings, of claims in the application:

Listing of Claims:

1. (currently amended) A corona discharge apparatus for spraying powders, comprising:

a) a housing having first and second opposed ends, the housing defining a chamber terminating in an outlet passageway at said first end of the housing;

b) a high voltage pin electrode positioned in the chamber spaced upstream of the outlet passageway, the high voltage pin electrode having a first surface area, and including at least one charging pin connected to a conductor located in an electrically insulated tube disposed along an axis of the housing, the conductor being connectable to a power supply for applying high voltages to the at least one charging pin;

c) a ground surface electrode positioned in the chamber spaced upstream from the high voltage pin electrode, the ground surface electrode having a second conducting surface area that is sufficiently larger than the first surface area of said high voltage pin electrode to give a pin-to-surface electrode configuration such that when a high voltage is applied to the high voltage pin electrode, an electrical field produced in a vicinity of the ground surface electrode is sufficiently low to prevent arc discharging occurring in the vicinity of the ground surface electrode in the chamber; ~~and~~

d) an inlet opening into the chamber for conducting a powder-gas mixture into the chamber, said inlet opening being located at the second end of the housing; and [[.]

e) means for supplying a cleaning gas toward the high voltage pin electrode to reduce powder deposits on the high voltage pin electrode,

wherein the chamber defines an inner cylindrical surface and the ground surface electrode is a cylindrical electrode having an outer diameter such that the cylindrical electrode is substantially concentric with the inner cylindrical surface, the cylindrical electrode having an inner surface which has the second conducting surface area that is sufficiently larger than the first surface area of the high voltage pin electrode.

2. - 5. (cancelled)

6. (currently amended) The apparatus according to claim ~~[[5]]~~ 1 wherein the means for supplying a cleaning gas to reduce powder deposits on the high voltage pin electrode includes the electrically insulated tube.

7. (currently amended) ~~The apparatus according to claim 4~~ A corona discharge apparatus for spraying powders, comprising:

a) a housing having first and second opposed ends, the housing defining a chamber terminating in an outlet passageway at said first end of the housing;

b) a high voltage pin electrode positioned in the chamber spaced upstream of the outlet passageway, the high voltage pin electrode having a first surface area, and including at least one charging pin connected to a conductor located in an electrically insulated tube disposed along an axis of the housing, the conductor being connectable to a power supply for applying high voltages to the at least one charging pin;

c) a ground surface electrode positioned in the chamber spaced upstream from the high voltage pin electrode, the ground surface electrode having a second conducting surface area that is sufficiently larger than the first surface area of said high voltage pin electrode to give a pin-to-surface electrode configuration such that when a high voltage is applied to the high voltage pin electrode, an electrical field produced in a vicinity of the ground surface electrode is sufficiently low to prevent arc discharging occurring in the vicinity of the ground surface electrode in the chamber;

d) an inlet opening into the chamber for conducting a powder-gas mixture into the chamber, said inlet opening being located at the second end of the housing; and

e) means for supplying a cleaning gas toward the high voltage pin electrode to reduce powder deposits on the high voltage pin electrode,

wherein the chamber defines an inner cylindrical surface and the ground surface electrode includes a plurality of sections of a cylindrical electrode mounted around the inner cylindrical surface with each section being separately or jointly grounded, the sections of the cylindrical electrode having inner surfaces

which cumulatively define the second conducting surface area that is sufficiently larger than the first surface area of the high voltage pin electrode.

8. (currently amended) The apparatus according to claim [[5]] 1 wherein a first section of the chamber upstream of the high voltage pin electrode containing the ground surface electrode has a cross sectional area which is less than that of a second section of the housing containing the high voltage pin electrode in order to increase a velocity of the powder-gas mixture flow within the first section and to create turbulence in order to keep the ground surface electrode from being coated by powder.

9. (currently amended) The apparatus according to claim [[5]] 1 wherein a first section of the chamber upstream of the high voltage pin electrode containing the ground surface electrode includes an insulated cylindrical member disposed symmetrically along the axis of the housing for narrowing the chamber in the first section in order to increase a velocity of the powder-gas flow and to create turbulence in order to keep the ground surface electrode from being coated by powder.

10. (previously presented) The apparatus according to claim 9 wherein the housing has a portion surrounding the insulated cylindrical member disposed symmetrically along the axis which has a radius which is larger than a radius of a portion of the housing surrounding the high voltage pin electrode.

11. (previously presented) The apparatus according to claim 9 wherein said insulated cylindrical member disposed symmetrically along the axis of the housing has a downstream end portion, and wherein the ground surface electrode includes an electrical conductor mounted on the downstream end portion so that electrical field lines are developed between the high voltage pin electrode and both the cylindrical electrode and the electrical conductor.

12. (currently amended) ~~The apparatus according to claim 4~~ A corona discharge apparatus for spraying powders, comprising:

a) a housing having first and second opposed ends, the housing defining a chamber terminating in an outlet passageway at said first end of the housing;

b) a high voltage pin electrode positioned in the chamber spaced upstream of the outlet passageway, the high voltage pin electrode having a first surface area, and including at least one charging pin connected to a conductor located in an electrically insulated tube disposed along an axis of the housing, the conductor being connectable to a power supply for applying high voltages to the at least one charging pin;

c) a ground surface electrode positioned in the chamber spaced upstream from the high voltage pin electrode, the ground surface electrode having a second conducting surface area that is sufficiently larger than the first surface area of said high voltage pin electrode to give a pin-to-surface electrode configuration such that when a high voltage is applied to the high voltage pin electrode, an electrical field produced in a vicinity of the ground surface electrode

is sufficiently low to prevent arc discharging occurring in the vicinity of the ground surface electrode in the chamber;

d) an inlet opening into the chamber for conducting a powder-gas mixture into the chamber, said inlet opening being located at the second end of the housing;

e) means for supplying a cleaning gas toward the high voltage pin electrode to reduce powder deposits on the high voltage pin electrode; and

f) including an insulated cylindrical member disposed symmetrically along the axis of the housing having a downstream end portion spaced upstream of the high voltage pin electrode, and wherein the ground surface electrode includes an electrical conductor mounted on the downstream end portion of insulated cylindrical member so that electrical field lines are developed between the high voltage pin electrode and the electrical conductor.

13. - 47. (cancelled)